REMARKS

Claims 1-25 are pending in this application, with claims 11-13 withdrawn from consideration. Claims 1, 2, 4, 5, 6, 7, 14, 15, 16 and 17 have been amended herein.

No new matter is added by these amendments. Support for the amendment is as follows:

In claims 1, 2, 4, 5, 6, 7, 14, 15, 16, and 17, the wording "not light-sensitive" has been replaced with –made of conductive material–. Support for the recitation that the electrodes are made of a conductive material may be found in the specification, for example, on page 41, lines 15-17.

Claim 1 is amended in the first paragraph to recite "A method for separating two or more kinds of molecules dissolved in a sample by the dielectrophoretic force," with amendments to the second paragraph of claim 1 to maintain antecedent basis. Support for this amendment may be found, for example, on page 5, lines 12-19, and page 96, lines 5-11.

The amendment is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. (Page 2 of the Office action) **New matter introduction by the use of the phrase "which is formed by electrodes which are not light-sensitive."** (page 5 of the Office action)

The objection is overcome by the amendments to the claims. The recitation that the electrodes "are not light-sensitive" has been deleted, and has been replaced with a recitation that the electrodes are "made of conductive material". As noted above, this amendment is supported by the specification on page 41, lines 15-17.

Claims 1-10, 15-17 and 24-25 are rejected under 35 U.S.C. §102(e) as anticipated by Parton et al. (U.S. 5,993,631).

The rejection of claims 1-10, 15-17 and 24-25 is respectfully traversed.

Applicant submits that, in Parton, the complex substance cannot be separated merely by positive or negative dielectrophoresis force. The following differences between Parton and the present invention are noted:

(a) In the method of Parton, it is described that when the positive dielectrophoresis force acts, the molecules become drawn on the electrode, and therefore the field traveling wave cannot operate on the molecules, thus failing to separated the molecules. On the other hand, in the present invention, the molecules can be separated by either the positive dielectrophoresis force or the negative dielectric force. Further, the description of Parton teaches away from the present invention, in which separation is effected **without** operation of the field traveling wave.

(b) The (negative) dielectrophoresis force is merely used to repel (draw) molecules from the electrode, and the molecules can be separated by operating the field traveling wave with respect to the drawn molecules. From this description, one skilled in the art understands that for separating molecules, the field traveling wave is essential in Parton, and the molecules cannot be separated merely by the (negative) dielectrophoresis force.

(c) Parton discloses that a special electrode is used, and a special voltage (electric field) is applied to thereby generate TWFM, and molecules can be separated by the TWFM. If separation

can be made without jointly using TWFM, TWFM should not be jointly used. One skilled in the art would understand from Parton that in the mere dielectrophoresis without using TWFM, a complex substance as in the present invention cannot be separated. In fact, Applicant submits that, in the field strength smaller than 500 kv/m carried out by Parton, the complex substance of the present invention cannot be separated. If the Examiner deems it appropriate, Applicant will present a Declaration demonstrating this point.

By contrast, in the present invention, dielectrophoresis without jointly using TWFM is carried out in the field strength of more than 500 kV/m, which is neither disclosed nor suggested in Parton.

(d) Further, in the Response to Arguments on page 6 of the Office action, the Examiner refers to the reference Price et al. *Biochemica et Biophysica Acta*, cited within Parton, but not made of record in the application. Applicant has therefore obtained a copy of Price and has included it in the IDS filed concurrently with this Amendment.

The Examiner states that Price indicates results of a dielectric constant of 0.2 S/m for *M. lysodeiktious*, for the frequency range of 20 Hz to 4MHz, and this frequency is the same as that of Claim 24 of the present application.

However, the field strength is shown by a relationship between voltage (kv) and **distance (m) between the +pole and -pole**, and is **independent of the frequency**. Even if the present invention uses the same frequency as the reference, it would not mean that the reference has the same field strength.

In fact, Price can be seen to disclose an electrode with a field strength **less than 333.33 kV/m**

(the strongest field strength in the reference, calculated from voltage: 20V, distance between electrodes: 60μm disclosed in Price, p. 223, Fig. 2). This would not meet the 500 kV/m or higher limitation of the present claims.

Further, in Price, page 222, right column, lines 2 to 7, it is described that: "For low-conductivity suspending solutions the field strengths in the plane of the electrodes near the glass substrate surface vary from around 0.8 MV/m to less than 80 kV/m between the electrodes."

However, since Parton discloses that the complex substance can be separated by TWFM, it is unclear how to combine Parton with Price, which merely discloses how to prepare an electrode. It is unclear how the combination of Parton and Price could result in the present invention.

Applicant therefore submits that claims 1-10, 15-17 and 24-25 are not anticipated by, and are non-obvious over, Parton et al.

Claims 1-10 and 14-25 are rejected under 35 U.S.C. §102(e) as being anticipated by Seul et al. (U.S. 6,387,707 B1).

The rejection is overcome by the amendments to the claims. As amended, claims 1-10 and 14-25 all have the limitation that the electrodes are "made of conductive material." This is supported, for example, by page 41, lines 15-17, in which it is described that the electrode is "made of conductive materials such as, for example, aluminum, gold, and the like."

By contrast, the corresponding electrode in Seul et al. is Seul's light sensitive electrode. Seul et al. is directed to light-controlled electrokinetic assembly of particles (abstract), and the light-

sensitive, semiconductor electrode in Seul et al. is clearly required in the reference. Therefore, there is no suggestion in Seul et al. for forming the electric field with electrodes which are not light-sensitive.

Seul's light sensitive electrode is a Si/SiOx electrode, that is, a semiconductor electrode, which formed of a semi-conductive material (semiconductor), not a conductive material. It is clear from descriptions of Seul, col. 2, lines 6-9, col. 9, lines 20-22, and col. 15, lines 43-45, that this light sensitive electrode is a Si/SiOx electrode consisting a silicon (Si) wafer and a silicon oxide (SiOx) film formed thereon (see Seul, col. 2, lines 9-12). In Seul, the silicon electrode is prepared by forming an oxide layer [silicon oxide (SiOx)] on the silicon (Si) wafer by means of UV-intervention oxide re-growth or UV-intervention photochemical oxide (see col. 3, lines 12-28; col. 9, lines 36-46; col. 13, lines 26-32).

Applicant therefore submits that there is no disclosure nor suggestion in Seul et al. that the electric field be formed with an electrode made of a conductive material, and the claims, as amended, are novel and non-obvious over Seul et al.

Claims 1-10 are rejected under 35 U.S.C. §102(e) as being anticipated by Becker et al. (U.S. 6,294,063).

The rejection of claim 1 is overcome by the amendment to claim 1. The rejection of claims 2-10 is respectfully traversed.

Claim 1 has been amended to recite "A method for separating two or more kinds of

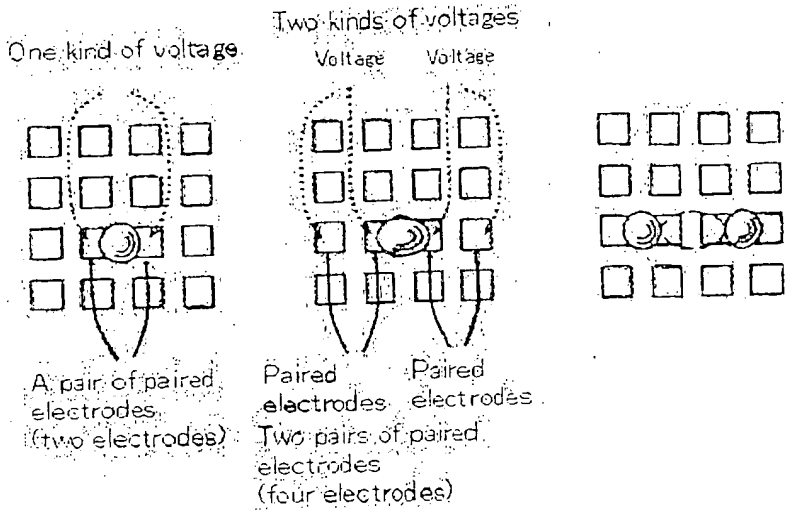
molecules dissolved in a sample by the dielectrophoretic force". Claims 1-10 recite methods involving separation of molecules from a "specific molecule". All of claims 1-10 therefore involve separation of molecules.

Applicant notes the following differences between the present claims and Becker.

(a) Since Becker discloses that compartmentalized packets are moved (separated), the separation itself of **molecules** which are present in a solution and are not compartmentalized distinguishes from the reference.

(b) In Becker, as can be seen in the lower part of Fig. 12, first, one kind of voltage (field) is applied to a pair of paired electrodes, (two electrodes) to grasp one packet, and then two kinds of voltages (fields), which are different from each other, are applied to at least two pairs of paired electrodes (four electrodes) to separate one packet into two packets This is not a separation of molecules by applying one kind of voltage (field) as in the present invention.

This is apparent from a description in embodiment 3 of Becker, that where a voltage (field) is switched by a pair of electrodes, one packet merely moves from one electrode to the other electrode. (In this case, one packet merely moves, and one packet is not separated into two packets.)



On the other hand, in the present invention, there must be one kind of voltage (field).

If in the present invention, the field (frequency and voltage) applied when molecules are separated were changed as in the method of Becker, the complex substance of a specific molecule to be an object and separation enhancing material, and the dielectrophoresis force acting on a molecule other than the specific molecule would be changed in response to the change of the field. As a result, the moving state of the specific molecule and the molecule other than the specific molecule would also change as the dielectrophoresis force changes, and therefore it would become difficult to separate them.

(c) Further, in the present application, wherein the complex substance of the specific molecule and the separation enhancing material is formed, the method described in Becker as pointed out by the Examiner is not used.

That is, in the method of Becker, **the compartmentalized packet and the compartmentalized packet are allowed to effect mutual action** to the utmost, but the **"specific**

molecule" in the present invention is not compartmentalized and is dissolved in a solution, and therefore the complex substance of the present invention is not formed as a result of the mutual action between the compartmentalized one and the compartmentalized one as in the method of Becker.

(d) Difference of molecules to be separated mutually

The present invention **is totally different** from Becker **in what is separated**. That is, in the separation of Becker, **one compartmentalized packet is divided (separated) into two separated compartmentalized packets**, and **both the state before being divided (separated) and the separated one are the compartmentalized packet**.

On the other hand, in the present invention, since more than two kinds of molecules dissolved in a solution are separated, at least **"specific molecule" and "molecule other than the specific molecule" are dissolved in a solution and not compartmentalized**.

(e) Difference in field to be applied

Both the present invention and Becker use dielectrophoresis, but the field used therein is totally different, as described above. That is, the present application uses **one kind of fixed field**, whereas Becker uses **a plurality of different fields (changed fields)**.

In the present invention, **a fixed (one kind)** uneven field having a field strength of more than 500 kV/m is formed in an electrode, which is used to separate molecules.

On the other hand, in the method of Becker, the compartmentalized packet is moved freely by dielectrophoresis or the like, and the packet is moved in a manner capable being programmed

along the channel suitably selected by **the programmable operating force** (col. 3, lines 23-26).

The "operating force" is the dielectrophoresis force produced as a result of **addressing individual elements (electrodes) by different electric signals to thereby form different fields** (col. 4, lines. 39-51). More specifically, **the electric signals are switched** with respect **to a combination of different electrodes** to thereby **form different fields** (col. 13, lines. 45-49; col. 13, line 50; col. 14, line 5).

Incidentally, if in the present invention, the field (frequency and voltage) applied when molecules are separated were changed as in the Becker's method, the complex substance to be an object of the specific molecule and the separation molecule and the separation enhancing material, and the dielectrophoresis force acting on molecules other than the specific molecule would also change. As a result, since the moving state of the specific molecule and the molecule other than the specific molecule would change as the dielectrophoresis force changes, it would be difficult to separate them.

Applicant therefore submits that claims 1-10, as amended, are not anticipated by, and are non-obvious over, Becker et al.

In view of the aforementioned amendments and accompanying remarks, the claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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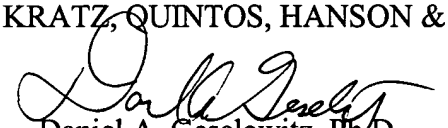

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